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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,935	06/27/2003	Takafumi Terahara	1344.1120	4453

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EXAMINER	
JEAN BART, RALPH	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 08/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,935	TERAHARA ET AL.	
	Examiner	Art Unit	
	Ralph Jean-Bart	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,13-15 and 17-24* is/are rejected.

7)☒ Claim(s) *2-12,16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/02/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is a first action on the merits. The instant application having Application number 10606935 has a total of 24 claims pending in the application; there are 6 independent claims and 18 dependent claims, all of which are ready for examination by the examiner.

Objection

The disclosure is objected to because of the following informalities: Page 15 paragraph 3 line 5 the word "Th n" is grammatically incorrect. "Th n" should be replaced by - -**Than**- -. Correction is required.

Page 15 paragraph 3 line 6 the word "comp nents n" is grammatically incorrect. "comp nents n" should be replaced by - -**components in** - -. Appropriate correction is required.

In addition, the applicant is urged to review the specification to correct typographical errors such as those noted above. Correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims18-21 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such

omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: lacks essential elements in claim preamble to disclose an apparatus.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claims 18-21, Applicant has claimed "an apparatus" **for multiplexing optical signals with a plurality of wavelengths** in the preamble to these claims; this implies that applicant is claiming a set of components, per se, lacking the underlying structure and function for any of the components. The claimed wavelength division apparatus does not define any structural and functional interrelationships between the components, which would permit the optical signal's functionality to be realized. Therefore, claims 18-24 are directed to non-statutory subject matter as wavelength multiplexing apparatus per se, i.e. the descriptions or expressions of the apparatus do not produced a useful, concrete, and tangible result.

Allowable Subject Matter

Claims 2-12 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The claim invention relates to A wavelength division multiplexing optical transmission system according to claim 1, wherein the type of modulation of said signal light is an NRZ modulation type, and the equation model expressing the transmission characteristics of said optical multiplexer and said optical demultiplexer is the one in which the shape of each transmission band corresponding to the wavelength of each signal light is expressed, using a frequency f, the center frequency fc of the transmission band, full width at half maximum .Δ(f)of the transmission band, and a filter order "n", in the following equation,$T(f) = 10 \log [\exp \{ - 2 \ln \sqrt{2} (f - fc / 2)^{2n} \}]$ (dB).

Fujiwara et al (U.S. Publication No. 20020015212) teaches the type of modulation is an NRZ modulation type (see paragraph 0205), full width at half maximum .Δ(f) of the transmission band (see paragraph 0098).

However, Fujiwara fails to teach a filter order "n", in the following equation, $T(f) = 10 \log [\exp \{ - 2 \ln \sqrt{2} (f - fc / 2)^{2n} \}]$ (dB).

Since no teaching can be found of obtaining a filter order "n", in the following equation,$T(f) = 10 \log [\exp \{ - 2 \ln \sqrt{2} (f - fc / 2)^{2n} \}]$ (dB). Since dependent claims 2-12 and 16 contain the language that is allowable as indicated above. Claims 2-12 and 16 are therefore novel and non-obvious.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 18-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Way et al (U.S. Pub No 20020021464).

With respect to claim 18 and 20 Way teaches a wavelength multiplexing apparatus for multiplexing optical signals with a plurality of wavelength (see figure 1 element optical transmitter 20), each component on a short wavelength side and a long wavelength side of each of said optical signals is eliminated using a filter (see figure 4; abstract; paragraph 0005), with a band narrower than spectrum width obtained based on a bit rate and a type of coding of each of said optical signals (see paragraph 0007 and 0008), to make spacing of said optical signs to be narrower than said spectrum width (see paragraph 0031).

With respect to claim 22 Way teaches An optical transmission system including a wavelength multiplexing apparatus for multiplexing optical signals with a plurality of wavelengths to output to a transmission path (see figure 1 elements 20), and a wavelength demultiplexing apparatus for demultiplexing wavelength division multiplexed light from said transmission path (see figure 1 element 44), each of said wavelength multiplexing apparatus and said wavelength demultiplexing apparatus eliminates each component on a short wavelength side and a long wavelength side of each of said optical signals using a filter with a band narrower than spectrum width obtained based on a bit rate and a type of coding of each of said optical signals (see figure 4 element 104; Paragraph 005) , to make spacing of said optical signals to be narrower than said spectrum width (see Paragraph 0031).

With respect to claims 19, 21, and 23 Fishman teaches a polarization independent optical parts (see figure 1 elements 52, 54).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1, 17, 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fishman et al (U.S. patent # 6,607,311) in View of IEEE reference " The road to multi-terabit/s WDM transmissions" by Sebastien Bigo.

With respect to claim 1 and 17, Fishman teaches A wavelength division multiplexing optical transmission system (see abstract), in which each signal light with different wavelengths output from a plurality of optical senders is multiplexed by an optical multiplexer to be transmitted to an optical transmission path (see figure 2 elements 35), and wavelength division multiplexing signal light propagated through the optical transmission path is demultiplexer depending on respective wavelengths by an optical demultiplexer to be received by a plurality of optical receivers (see figure 2 elements 70), a plurality of optical senders generates signal light (see figure 2 element 35), a frequency spacing thereof is set as to approach spectrum efficiency (see column 2 lines 61-62). Fishman fails to teach a bit rate, the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the assumption of an equation model expressing transmission characteristics of said optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value.

However the IEEE reference teaches a bit rate, the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the assumption of an equation model expressing transmission characteristics of said

optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value (see Sebastien Bigo) .

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the WDM Optical Network system of Fishman by incorporating Sebastien Bigo's bit rate, the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the assumption of an equation model expressing transmission characteristics of said optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value. The motivation for this limitation in Fishman is to increase the bandwidth capacity as taught by IEEE reference.

With respect to 13, Fishman teaches each of an optical multiplexer and demultiplexer is constituted using an arrayed waveguide grating (see column 1 lines 15-20).

With respect to claim 14, Fishman teaches an optical interleave using an interference filter and an array waveguide (see column 1 lines 15-20).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fishman et al (U.S. patent # 6,607,311) and Sebastien Bigo as applied to claim 1 above, and further in view of Archambault (U.S patent No 6,567,196).

With respect to claim 15, Fishman and Sebastien teach all the limitations of claim 1. They fail to teach a dielectric multi-layer film filter.

However, Archambault teaches a dielectric multi-layer film filter (see column 3 lines 64-67).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the WDM Optical Network system of Fishman and the transmission capacity of Sebastien by incorporating a multi-layer film filter.

The motivation for this modification of Fishman and Sebastien is to provide a method that reduces or eliminates the interference loss and also to minimize the cost of additional channels in optical multiplexer and demultiplexer system as taught by Archambault (see Archambault column 2 lines 6-11; column 3 lines 24-31).

Claim 1, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Way et al (U.S. publication # 20020021464) in View of IEEE reference " The road to multi-terabit/s WDM transmissions" by Sebastien Bigo.

With respect to claim 1 and 17, Way teaches A wavelength division multiplexing optical transmission system (see figure 1 element optical transmitter 20), in which each signal light with different wavelengths output from a plurality of optical senders is multiplexed by an optical multiplexer to be transmitted to an optical transmission path (see figure 4; abstract; paragraph 0005), and wavelength division multiplexing signal light propagated through the optical transmission path is demultiplexer depending on respective wavelengths by an optical demultiplexer to be received by a plurality of optical receivers (see figure 1 element 44), a plurality of optical senders generates signal light (see figure 2 element 35), a frequency spacing thereof is set as to approach spectrum efficiency (see paragraph 0031), a bit rate (see figure 4 element 104; paragraph 005). Way fails to teach the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the assumption of an equation model expressing transmission characteristics of said optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value.

However the IEEE reference teaches the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the

assumption of an equation model expressing transmission characteristics of said optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value (see Sebastien Bigo) .

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the WDM Transport System of Way by incorporating Sebastien Bigo's, the product of a transmission distance and a transmission capacity becomes a maximum value, said product being calculated based on the determination of the type of modulation of signal light and also the assumption of an equation model expressing transmission characteristics of said optical multiplexer and said optical demultiplexer, and said optical multiplexer and said optical demultiplexer have transmission characteristics in which transmission bandwidth is set in accordance with said equation model, and also according to the spectrum efficiency at which the product of the transmission distance and the transmission capacity becomes a maximum value. The motivation for this limitation in Fishman is to increase the bandwidth capacity as taught by IEEE reference.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ralph Jean-Bart whose telephone number is (571) 270-1017. The examiner can normally be reached on Monday to Thursday from 8 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Robertson, can be reached on 571-272-4186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJB
Ralph Jean-Bart

07/27/2006

DAVID ROBERTSON
SUPERVISORY PATENT EXAMINER